

US EPA ARCHIVE DOCUMENT

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/4/99

RCRA Corrective Action  
Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name: Chevron  
Facility Address: Hooven, Ohio - Intersection of U.S. 50 and SR 128  
Facility EPA ID #: OHD 004 254 132

1. Has all available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

X If yes - check here and continue with #2 below.

\_\_\_\_\_ If no - re-evaluate existing data, or

\_\_\_\_\_ if data are not available, skip to #8 and enter "IN" (more information needed) status code.

**BACKGROUND**

**Definition of Environmental Indicators (for the RCRA Corrective Action)**

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

**Definition of "Migration of Contaminated Groundwater Under Control" EI**

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

**Relationship of EI to Final Remedies**

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to stabilizing the further spread of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

**Duration / Applicability of EI Determinations**

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

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2. Is **groundwater** known or reasonably suspected to be “contaminated”<sup>1</sup> above appropriately protective “levels” (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

☒ **X** If yes - continue after identifying key contaminants, citing appropriate “levels,” and referencing supporting documentation.

☐ If no - skip to #8 and enter “YE” status code, after citing appropriate “levels,” and referencing supporting documentation to demonstrate that groundwater is not “contaminated.”

☐ If unknown - skip to #8 and enter “IN” status code.

**Rationale and Reference(s):**

**A five million gallon release of refined gasoline and diesel fuel has resulted in free product present on the water table in areas up to one foot thick\*. Benzene concentrations in groundwater exceed the 5ppb limit for the Safe Drinking Water Act - Maximum Contaminant Limits (MCLs). The benzene concentration in groundwater ranges from 3500 ppb to 3 ppb at the facility\*.**

\* Chevron Cincinnati Facility - Groundwater Corrective Measure Study, Draft October 26, 2001. Figures 2-14 and 2-15.

**Footnotes:**

<sup>1</sup>“Contamination” and “contaminated” describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate “levels” (appropriate for the protection of the groundwater resource and its beneficial uses).

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3. Is the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"<sup>2</sup> as defined by the monitoring locations designated at the time of this determination)?

  X   If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"<sup>2</sup>.

       If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"<sup>2</sup>) - skip to #8 and enter "NO" status code, after providing an explanation.

       If unknown - skip to #8 and enter "IN" status code.

**Rationale and Reference(s):**

**Currently monitoring of groundwater contamination consists of collecting water level and LNAPL thickness measurements six times a year from 150 monitoring wells (1); and semi-annual sampling of 34 monitoring wells across the facility including the islands, early warning monitoring wells, Hooven Area wells, and the facility wells. (2) The samples are taken 2 times a year to monitor the high and low water table conditions at the site. The groundwater samples are analyzed for BETX, chlorobenzene, 1,2-Dichlorobenzene, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, and dissolved lead.**

**Semi-annual Monitoring results show the dissolved phase benzene plume is maintaining its current horizontal boundary. In the Hooven Area there are non-detect monitoring wells surrounding the plume. Along State Route 128 the dissolved phase benzene plume ends at the road, this is due to the pinching out of the gravel aquifer as the bedrock starts to outcrop forming the ridge to the east of the valley. In the south of the facility the dissolved phase benzene plume borders the Great Miami River. This plume is kept from spreading by the production wells creating a gradient away from the river. (3)**

**Many of the monitoring well locations have nested wells at 3 depths labeled shallow, intermediate, and deep. The shallow well is screened across the water table, a deep well screened at the bottom of the aquifer and an intermediate well in between. Sampling and analysis from these nested wells reveal that concentrations observed in the deep wells are an order of magnitude less than the levels observed in the shallow wells. The vertical extent of the dissolved phase hydrocarbon plume occurs at 20 - 30 feet below the low water table. (4)**

**Hydraulic Control of the LNAPL is achieved by pumping of 14 high-volume production wells at the facility. The production wells create an inward hydraulic gradient that captures free-phase LNAPLs and prevents further lateral migration. During low water tables more free-phase LNAPL is released from the pore spaces and more recovery is possible, at high water table LNAPL is entrapped in pore spaces and the dissolved component may increase. The area between the high and low water table where hydrocarbons have been concentrated is known as the smear zone. Three million gallons of free product has been recovered since pumping began.**

**Continued sampling of monitoring wells in the SW quadrant area near Hooven will be made on a semi-annual basis to ensure no expansion of the dissolved phase plume in this area. The bi-monthly water level and LNAPL thickness measurements monitor the free-product and water levels to optimize hydraulic control and recovery of hydrocarbons.**

**(1) Liquid Hydrocarbon Monitoring, Fourth Bi-Monthly Event, Chevron Cincinnati Facility, Hooven, Ohio, November 16, 2001.**

**(2) First Semi-Annual Sampling Event - 2001; Groundwater Sampling Report, Dissolved Phase Identification-Phase XII, October 10, 2001.**

**(3) Chevron Cincinnati Facility - Groundwater Corrective Measure Study, Draft October 26, 2001.**

**(4) Summary of Chevron Cincinnati Facility monitoring well analyses from 1998 - May 2000.**

2 "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

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4. Does "contaminated" groundwater **discharge** into **surface water** bodies?

\_\_\_\_\_ If yes - continue after identifying potentially affected surface water bodies.

  **X**   If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.

\_\_\_\_\_ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

**Gradient resulting from the difference on water table elevation production well 15 and 20 and the monitoring well nests near the river MW-48 and MW-85 is one to three and a half feet in the 2001 potentiometric surface maps.**

**Surface water samples were taken in April 1998 and analyzed for VOCs, SVOCs, and Metals. The analysis revealed non detect for all analysis, except a small hit (.0023mg/L) for lead.**

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5. Is the **discharge** of “contaminated” groundwater into surface water likely to be “**insignificant**” (i.e., the maximum concentration<sup>3</sup> of each contaminant discharging into surface water is less than 10 times their appropriate groundwater “level,” and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

\_\_\_\_\_ If yes - skip to #7 (and enter “YE” status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration<sup>3</sup> of key contaminants discharged above their groundwater “level,” the value of the appropriate “level(s),” and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not suspected to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

\_\_\_\_\_ If no - (the discharge of “contaminated” groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration<sup>3</sup> of each contaminant discharged above its groundwater “level,” the value of the appropriate “level(s),” and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations<sup>3</sup> greater than 100 times their appropriate groundwater “levels,” the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

\_\_\_\_\_ If unknown - enter “IN” status code in #8.

Rationale and Reference(s): \_\_\_\_\_  
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<sup>3</sup> As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

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6. Can the **discharge** of “contaminated” groundwater into surface water be shown to be “**currently acceptable**” (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented)?

\_\_\_\_\_ If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site’s surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment<sup>5</sup> with documentation demonstrating that the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment include: surface water body size, flow, use/classification/habitats and contaminant loading limits, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment “levels,” as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

\_\_\_\_\_ If no - (the discharge of “contaminated” groundwater can not be shown to be “**currently acceptable**”) - skip to #8 and enter “NO” status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

\_\_\_\_\_ If unknown - skip to 8 and enter “IN” status code.

Rationale and Reference(s): \_\_\_\_\_  
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<sup>4</sup> Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

<sup>5</sup> The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.



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Rationale and Reference(s):

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8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

  X   YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the Chevron Cincinnati Facility, Hooven, Ohio, EPA ID # OHD 004 254 132, located at Intersection of U.S. 50 and SR 128, Hooven, Ohio. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

       NO - Unacceptable migration of contaminated groundwater is observed or expected.

       IN - More information is needed to make a determination.

Completed by	(signature) <u><i>Christopher S. Black</i></u>	Date	<u>6/6/02</u>
	(print) <u>Christopher S. Black</u>		
	(title) <u>Geologist</u>		<u>6/6/02</u>
Supervisor	(signature) <u><i>Joseph M. Boyle</i></u>	Date	<u>6/6/02</u>
	(print) <u>Joseph M. Boyle</u>		
	(title) <u>Chief, Enforcement and Compliance Branch</u>		
	(EPA Region or State) <u>Region 5</u>		

Locations where References may be found:

U.S. EPA Record Center - 7<sup>th</sup> Floor  
77. W. Jackson Chicago, IL 60604  
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